cases. The treatment consisted in irrigation of the rectum twice daily, through a speculum, with a 3 per cent. solution of boric acid, followed by bichloride of mercury 1 : 8000, in order to destroy the gonococci, half a litre of each being used. The erosions were touched with argentamin(?), 2 per cent. solution. Ichthyol suppositories were also used with good effect.

HYGIENE AND PUBLIC HEALTH.

UNDER THE CHARGE OF
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DISINFECTION OF WELLS DURING CHOLERA EPIDEMICS.

SURGEON-CAPTAIN P. W. O'GORMAN, in the *Indian Medical Gazette*, July, 1896, says that during a recent outbreak of cholera at Midnapore, which began at a season favorable for its spread, the number of cases (117) was supposed to have been kept down by reason of the introduction of special preventive measures. Cases occurred in all of the six wards into which the place is divided. The European quarter and the central jail were quite free. The former used water from the best well, and either filtered or boiled and filtered it before using; in the latter, especial care is taken of the water and its regular boiling and filtering, and no case of cholera had occurred there during two years. The first person afflicted in the town came from Calcutta, where he contracted the disease, and then contaminated the well in his yard. Two days after his death a relative was attacked in the same house along with a next-door neighbor, whose well was about thirty feet distant from the first, and only twenty feet from a cesspool. The cases spreading, forty-six public and private wells were disinfected with permanganate of potassium, and in a short time the outbreak ceased. From an ounce to an ounce and a half of the salt, according to the size of the well, was dissolved in a bucket, poured into the well, and agitated. If in a half-hour after the addition a specimen of the water showed a red tinge, it was considered that enough had been added; if the red had vanished, more was added until the necessary amount was reached.

E. H. HANKIN, M. A. (*Indian Medical Gazette*, July, 1896), writing on the use of permanganate in combating water-borne diseases, says that in some cases from an excess of zeal too much may be added, and that in consequence fish, frogs, turtles, etc., put into the wells by the inhabitants to keep the water clean, are killed, so that the water becomes putrid, and thus the people are driven to use other untreated sources of supply. In other cases too small an amount is added, so that the pink color at first produced fades in a short time and before any action on the cholera microbes present is likely to have been produced. Enough permanganate should be added to produce a coloring lasting twenty-four hours, and from one to eight ounces is usually sufficient for ordinary wells.

A NEW ADULTERANT FOR THE PRESERVATION OF MILK.

MR. G. DENIGÈS (*Revue Internationale des Falsifications*, ix. 36) finds on analysis of three powdered preparations used in France for the preservation of milk, that two contained chromate of potassium and the other was a mixture of the chromate and bicarbonate. Of the latter, two grammes were recommended for fifty litres of milk, but in one specimen of milk he found three decigrammes. The presence of the adulterant is very easily detected by mixing together equal volumes of the suspected milk and a 2 per cent. solution of silver nitrate, when a red color, varying in intensity according to the amount of the adulterant present, is produced.

FORMALDEHYD GAS AS A PRACTICAL DISINFECTANT.

PROFESSOR E. PFUHL (*Zeitschrift für Hygiene und Infectionskrankheiten*, xxii. 339) reports the result of his experiments with formaldehyd as a room-disinfectant, using an improved form of Krell's lamps. Miquel, Philipp, and Oehmichen had already reported good results, Miquel concluding that the agent is the only safe and reliable quickly acting means for disinfecting large spaces, thereby disagreeing with Ascoli, who found its action to be not uniformly exerted throughout the room. Dieudonné had tried the Tollen's lamp in a room of 28.4 cubic metres, converting 200 grammes of methyl alcohol into formaldehyd, and using cholera and typhoid cultures and anthrax-spores as test-objects. After twenty-four hours' exposure of the test-objects in the well-closed room, it was found that the cholera and typhoid germs were killed, but not so the anthrax-spores. After another period of twenty-four hours only a part of the latter at about the middle level of the room were killed. On trying a Krell's lamp, with which 320 grammes of methyl alcohol were converted into formaldehyd, all of the organisms were killed within twenty-four hours. Pfuhl obtained seventeen of the improved Krell's lamps, each having a capacity of 200 c.cm., and conducted his experiments in three rooms of 263, 92, and 60 cubic metres capacity. The test-objects, fresh and dried tuberculous sputa, pure cultures of typhoid, cholera, and diphtheria, anthrax-spores, tetanus-spores, streptococci, and staphylococcus aureus, were exposed in open glass dishes about the rooms. The lamps were placed so as to insure uniform distribution of the gas. The duration of the generation of the gas was commonly twenty to twenty-one hours, the experiments beginning mostly between eleven A.M. and noon, and ending at eight or nine A.M., when the doors and windows were opened. In several of the experiments the duration was but fifteen hours. Most of the gas disappeared soon after providing an exit, and one could work in the rooms an hour later, though not with complete comfort. The odor often persisted for two days. On going into a room in which the lamps were still burning almost unbearable irritation of the eyes and nose was caused, and breathing was impossible. The results of the experiments showed in general that much depends on the thickness of the layer of infective material. Thus, one form may be killed after exposure to a certain amount of gas, and again be alive after exposure of a deeper layer to a greater amount of gas, the penetration of the latter being not sufficiently deep.

Results.

Test-objects.	Amount of methyl alcohol (converted to formaldehyd) required per cubic metre to kill.
Tubercle-bacilli in fresh sputum	14.1 grammes.
Tubercle-bacilli in dried sputum	15.7 "
Other bacteria in fresh sputum	6.0 "
Fresh agar culture of typhoid bacilli	12.3 "
Dried agar culture of typhoid bacilli	47.1 "
Fresh agar culture of cholera-bacilli, not killed by	14.1 "
Fresh agar culture of diphtheria-bacilli	6.0 "
Dried agar culture of diphtheria-bacilli	21.2 "
Fresh agar culture of streptococcus	4.6 "
Dried agar culture of streptococcus	6.0 "
Fresh agar culture of staphyl. pyog. aureus	14.1 "
Dried agar culture of staphyl. pyog. aureus	62.8 "
Fresh agar culture with anthrax-spores, not by	94.1 "
Dried anthrax-spores, not by	94.1 "
Dried tetanus-spores, not by	94.1 "

Thus it appears that fresh and dry tubercle-bacilli are killed with comparative ease, but that on the whole the agent is not well suited to general disinfection. Many difficulties present themselves, many lamps are needed, and the agent is a bad one for handling. It cannot be used in a compressed form in cylinders, since it goes from monoformaldehyd into tri-, hexa-, and other higher polymers, which are indifferent bodies, hardly to be considered as disinfectants.

Drs. G. Roux and **A. Trillat** (*Annales de l'Institut Pasteur*, ix.) experimented with the same agent in a room of 78 cubic metres capacity, burning 5000 grammes of methyl alcohol, and did not succeed in completely killing the various infectious materials exposed.

Dr. K. Walker (*Zeitschrift für Hygiene und Infectionskrankheiten*, xxi. 421) states that formalin (a 40 per cent. solution of formaldehyd) in the strength of one to ten thousand prevents the growth of cholera, typhoid, diphtheria, and staphylococcus pyogenes aureus, and as gas in great dilution greatly restricts their growth; that in 1 per cent. solution pure cultures of pathogenic germs are killed in one hour, and in weak alcoholic solution its action is intensified; and that feces are almost instantly deodorized by a 1 per cent. solution, and by a 10 per cent. solution are sterilized within ten minutes.

Dr. Nils Englund (*Om Formaldehyden*, Stockholm, 1895), experimenting to discover which of the processes for disinfecting dwellings with formaldehyd is the most applicable, found that the various lamps were two small and gave uncertain results. Two methods proved to be highly effective against the various bacteria with which the rooms were infected: One by spraying the walls, furniture, etc., with a 2 per cent. solution and allowing the room to remain closed for twenty-four hours; 60 to 70 c.c. of solution are enough for a square metre of surface. The other by evaporation from sheets dipped into a solution of half a kilo of calcium chloride in a litre of formaldehyd and hung in the room. The room is left closed until the next day. A sheet of two square metres is enough for eight cubic metres of space. The agent is found to be particularly useful for furs, books, etc. The method by spraying is a very cheap process, but those engaged in the work must protect the eyes by a special form of glasses, and the hands with gloves or vaseline, and must use a cotton-wool respirator.

[Formaldehyd, the aldehyd of formic acid, is produced when the vapor of methyl alcohol is passed with air over a glowing platinum spiral. It is a colorless, irritating gas, easily soluble in water, and easily oxidized in the air to formic acid.]

Poisonous Action of Sulphuric Acid and its Salts in Foodstuffs.

Dr. H. Kionka (*Zeitschrift für Hygiene und Infectionskrankeiten*, xxii. 351) shows that sulphite of sodium in practical doses exerts on cold-blooded animals an injurious effect on the heart and a paralyzing action on the central nervous system, and that in large doses it is rapidly fatal to warm-blooded animals. Moderate doses, such as would agree with the amount of the substance prescribed in the directions for use of food-preservatives containing it, were found to affect seriously the lungs and kidneys. These preparations are extensively used by sausage-makers and others for the preparation of sausages, meats, wines, beers, canned vegetables, and fruit. In his experiments large doses were used, but the continued small doses with food are regarded as unwarrantable. Even after cooking, at least two-thirds of the amount originally present are retained. Thirty-one dry meat-preservatives examined consisted of sodium sulphite with more or less sodium sulphate, bisulphite, and chloride, and in some cases borax; but in general they were mixtures of sulphate and sulphide. Fourteen liquid preservatives proved to be mixtures of sulphite and sulphate of calcium or of sulphite, sulphate, and bisulphite of sodium. Tinned foods do not need any preservative, as they are sterilized by heat; but those put up in glass, which easily breaks in the process, are often so adulterated. Sendtner (Munich) found in thirty-two samples from 26.4 to 482.6 milligrammes per jar.

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